

pressure, wherein the gap remains continuous and uniform under operating pressure.

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REMARKS:

A minor change is made to the specification. Claims 1 and 7 are amended; marked up versions of the amended claims are attached hereto pursuant to 37 C.F.R. § 1.121(c)(ii). Support for the amendments to claim 1 and 7 can be found on page 5, lines 26-29, and page 6, lines 10-22, of the specification. Claims 1-11 are pending in the application. Admission of these amendments is requested under 37 C.F.R. § 1.116(b). In this connection, these amendments were not earlier presented because they are in response to the matters pointed out for the first time in the Final Office Action. Also, admission is requested under 37 C.F.R. § 1.116(a) as presenting rejected claims in better form for consideration on appeal. No new matter is introduced. Reexamination and reconsideration of the application, as amended, are respectfully requested.

FORMALITIES:

The specification is objected to because it does not include the application number of a referenced patent application on page 4, lines 9-10. In response, applicants added the application number to the specification as shown above.

INFORMATION DISCLOSURE STATEMENT:

The Examiner stated that the references cited in the Search Report filed 9-30-02 have been considered, but will not be listed on any patent resulting from this application because they were not provided on a separate list in compliance with 37 CFR § 1.98(a)(1). In response, the applicants respectfully submit that the three references that were cited in the Search Report filed 9-30-02 were also separately listed on a PTO-1449 form that was a part of the IDS that was filed together with the Search Report on 9-30-02. Accordingly, applicants believe that no additional listing of the references contained in the Search Report is required.

CLAIM REJECTIONS UNDER 35 U.S.C § 102:

Claims 1, 3, and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ernst, U.S. Patent No. 4,448,424 (the '424 patent). Applicants respectfully traverse this rejection.

In the response to the previous Office Action, applicants argue that the '424 patent does not anticipate or make obvious independent claims 1 and 7, because 1) it does not teach or suggest a gap that prevents fluid from flowing therethrough under working pressure, and 2) it does not teach or suggest a continuous gap that has an initial uniform width that remains constant under working pressure. The Examiner did not find either argument to be persuasive.

With respect to the first argument, the Examiner appears to believe that because the '424 patent states that there is "no net flow" through the gap, it teaches a gap that prevents fluid from flowing therethrough. Applicants disagree with the Examiner.

Both independent claims 1 and 7 of the present invention require a gap having a size that allows the fluid to fill the gap but prevents the fluid from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure. The '424 patent does not teach or suggest preventing fluid from flowing through the gap. Instead, it teaches a "zero net flow" to the pressure side of the seal. Such "zero net flow" requires a balance of the "pumping of lubricant through the seal in each direction of the stroke" (column 2, lines 36-39). Thus, unlike the present invention that prevents the fluid from flowing through in either direction, the '424 patent only limits net flow, but allows the lubricant to flow through the seal in each direction. Therefore, in view of the teachings of the '424 patent, those skilled in the art would not have expected that the fluid may be prevented from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure.

With respect to the second argument, the Examiner did not find it to be persuasive because "the features upon which applicant relies (i.e., that the gap has an initial uniform width that remains constant under working pressure) are not

recited in the rejected claim(s).” In response, applicants amended claims 1 and 7 by adding a limitation requiring the sealing member and the moving member to define an initial continuous and uniform gap, which remains continuous and uniform under operating pressure.

Also, the Examiner rejected the second argument because allegedly “the specification does not appear to state that the gap ‘has an initial uniform width that remains constant under working pressures’ as argued by Applicant.” Applicants disagree.

Applicants respectfully draw the Examiner’s attention to Figure 2, page 5, lines 26-29, and page 6, lines 10-33, of the specification. On page 6, lines 10-33, in reference to Figure 2 that depicts a continuous and uniform gap 26, the specification teaches how to obtain such uniform and continuous gap while assembling the clearance seal and the moving member. In particular, in lines 14-19, the specification explains that initial uniform gap is obtained by “closely controlled radial dimensions of an outer wall of the piston and the internal wall 28 of sealing member and a high assembly precision.” “[T]o simplify the control of the critical gap 26, in the preferred embodiment, the cross-sections of the internal and the outer walls 28 and 29 have substantially circular shapes.” Therefore, the specification of the present invention teaches that the sealing member and moving member are assembled to provide an initial uniform width of the gap between the sealing member and the moving member.

The initial uniform and continuous gap, which is established during assembly, remains uniform and continuous when operation pressure is applied. For example, on page 5, lines 26-29, the specification states: “The sealing member and the piston define a continuous and uniform gap 26. The gap 26 has a size that allows the fluid to fill the gap but prevents the fluid from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure.” Therefore, contrary to the Examiner’s belief, the specification teaches that the gap 26 has an initial uniform width that remains uniform under working pressures.

The '424 patent does not anticipate amended claims 1 and 7. First, as explained above, the '424 patent does not teach a gap having a size that prevents the fluid from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure. Second, the '424 patent does not teach an initial continuous and uniform gap that remains to be continuous and uniform under operating pressure.

The '424 patent has no teaching whatsoever of an initial gap formed during seal assembly, much less of an initial continuous and uniform gap that remains to be continuous and uniform under operating pressure. To the contrary, the '424 patent teaches no initial gap at all. The specification of the '424 patent states, "Under static conditions the interference fit and/or external load provide intimate contact at 27 between the central section of the seal and the surface of the rod" (column 3, lines 15-21). Only when the rod starts moving under operating pressure does the lubricant become drawn between the seal and the rod, and the pressure from lubricant produces a clearance. Thus, the '424 patent does not teach an initial uniform gap.

The '424 patent does not make instant claims 1 and 7 obvious because it teaches away from the present invention. First, nothing in the '424 patent suggests that a fluid may be prevented from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure.

Second, as explained above, the '424 patent does not suggest an initial uniform gap. Instead, the '424 patent requires a radial compression of the seal against the rod under inoperative conditions. Thus, when the piston seal of the '424 patent is assembled, there is no initial gap whatsoever between the seal and the rod, much less a uniform gap. It is only when the rod starts reciprocating, a gap forms between the seal and the rod, as a result of hydrodynamic pressure from the lubricant.

Therefore, in view of the teachings of the '424 patent, the ability to form an effective seal with a continuous gap that has an initial uniform width that remains uniform under working pressures would not have been expected by those skilled in

the art. It also would not have been expected by those skilled in the art that the gap may be of such a size that prevents the fluid from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure. Therefore, instant claims 1 and 7 are neither anticipated nor rendered obvious by the '424 patent. Claim 3 depends from claim 1 and is also patentable over the '424 patent.

CLAIM REJECTIONS UNDER 35 U.S.C § 103:

Claims 2 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the '424 patent in view of Holland, U.S. Patent No. 4,501,120 (the '120 patent). Applicants respectfully traverse this rejection.

Claims 2 and 8 depend from claims 1 and 7, respectively. As discussed above, the '424 patent does not anticipate or render obvious claims 1 and 7. The '120 patent cannot remedy the defects of the '424 patent and is not relied upon by the Examiner for such. Instead, the Examiner cites the '120 patent for teaching "making a clearance seal and piston of ceramic material."

The '120 patent has no teaching whatsoever of a continuous and uniform gap between the sealing member and the moving member that prevents the fluid from flowing through the gap. To the contrary, the '120 patent requires that "... the clearance seal around the piston assures ... leakage [of gas] in each direction past the piston" (column 5, lines 65-68). Similarly, there is nothing in the '120 patent that would teach or suggest an initial continuous and uniform gap that remains uniform under working pressure. Accordingly, dependent claims 2 and 8 are patentable over a combination of the '424 patent and the '120 patent. Withdrawal of these rejections is thus respectfully requested.

Claims 1, 3-7, and 9-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kostohris, U.S. Patent No. 5,493,954 (the '954 patent) in view of the '424 patent. Applicants respectfully traverse this rejection.

Claims 3-6 and 9-11 depend from claims 1 and 7, respectively. As discussed above, the '424 patent does not anticipate or render obvious claims 1 and 7. The '954 patent cannot remedy the defects of the '424 patent and is not relied upon by

the Examiner for such. Instead, the Examiner cites the '954 patent for teaching "a seal assembly (pump) comprising a stationary member (housing or casing), moving member 14, and sealing member 34." There is nothing in the '954 patent that would teach or suggest a continuous and uniform gap under both static and dynamic conditions between the sealing and moving members. Accordingly, claims 1, 3-7, and 9-11 are patentable over a combination of the '424 patent and the '954 patent. Withdrawal of these rejections is thus respectfully requested.

Applicants believe the foregoing amendments place the application in condition for allowance and early, favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

Date: March 12, 2003

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**Version with markings to show changes made:**

**IN THE SPECIFICATION:**

Please replace the fourth paragraph on page 3 with the following text:

By eliminating a direct contact between the sealing member and the moving member, the present clearance seal assembly alleviates many of the problems associated with the conventional seals discussed above. In particular, the advantages of this approach include a minimal wear of the part, simplified assembly and maintenance, significantly improved reliability, and a decreased maintenance cost. The clearance seal of the present invention may be utilized in any device or system that requires drawing, moving, and dispensing of fluids. The invention may be particularly advantageous for use in high-precision pumps employed in analytical instrumentation. For example, a piston pump with a clearance seal manufactured in accordance with the present invention may be beneficially utilized for sample aspiration and dispensing in the Nexgen Access System (Beckman Instruments, CA), disclosed in a U.S. patent application serial no. 09/815,088 titled "Method and System for Automated Immunochemistry Analysis," which has been commonly assigned to the assignee of the present invention and relevant parts of which are incorporated by reference herein.

**IN THE CLAIMS:**

Please replace the text of claims 1 and 7 with the following text:

1. (Amended) A clearance seal assembly comprising:
  - a stationary member defining a first side, a second side and an opening connecting the first and second side;
  - a moving member moveably disposed through the opening; and
  - a sealing member circumferentially disposed between the stationary member and the moving member, wherein the sealing member and the moving member,

when assembled, define [a] an initial continuous and uniform gap, having a size that allows the fluid to fill the gap but prevents the fluid from flowing through the gap from the first side to the second side of the opening under an operating pressure differential between the first and the second side, wherein the gap remains continuous and uniform under operating pressure.

7. (Amended) A pump, comprising:

a housing structure having an internal wall defining a suction chamber for containing a fluid;

a piston movably disposed within the chamber; and

a sealing member circumferentially disposed between the housing structure and the piston, the sealing member having a fluid-tight relationship with the housing structure, and the sealing member and the piston, when assembled, defining [a] an initial continuous and uniform gap, wherein the gap has a size that allows the fluid to fill the gap but prevents the fluid from flowing through the gap from the suction chamber to an outside of the chamber under an operating fluid pressure, wherein the gap remains continuous and uniform under operating pressure.